

ch-1 to ch4

SEVEN STAR INTERNATIONAL SCHOOL BANI

Class- 10th (Mathematics)

PT-1

Maximum Marks : 40

Time Allowed: 1:30 Hrs.

General Instructions:

1. This Question Paper has 4 Sections A-D.
2. Section A has 10 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 5 questions carrying 03 marks each.
5. Section D has 1 questions carrying 05 marks.
6. All Questions are compulsory.

SECTION A

Consists of 10 questions of 1 mark each.

1. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$; a, b being prime numbers, then LCM (p, q) .
 (a) ab (b) a^2b^2 (c) a^3b^2 (d) a^3b^3
2. The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively is:
 (a) 13 (b) 65 (c) 875 (d) 1750
 $70 - 5 = 65$ HCF
 $125 - 8 = 117$
3. If one of the zero of the polynomial $(k^2 + 4)x^2 + 13x + 4k$ is reciprocal of the other then $k = ?$
 (a) 2 (b) 1 (c) -1 (d) -2
 $\text{Product of roots} = 1$
 $\frac{\alpha}{\beta} = \frac{4k}{k^2 + 4}$
4. If α and β are the zeros of the polynomial $4x^2 + 3x + 7$, then $\frac{1}{\alpha} + \frac{1}{\beta} = ?$
 (a) $\frac{7}{3}$ (b) $-\frac{7}{3}$ (c) $\frac{3}{7}$ (d) $-\frac{3}{7}$
 $\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta}$
5. A quadratic polynomial whose sum and product of zeroes are -5 and 6 is
 (a) $x^2 - 5x - 6$ (b) $x^2 + 5x - 6$ (c) $x^2 + 5x + 6$ (d) none of these
6. The values of k for which the roots of quadratic equation $x^2 + 4x + k = 0$ are real, is
 (a) $k \geq 4$ (b) $k \leq 4$ (c) $k \geq -4$ (d) $k \leq -4$
7. The value of k for which the system of equations $x + 2y = 3$ and $5x + ky + 7 = 0$ has no solution
 (a) 10 (b) 6 (c) 3 (d) 1
 $\frac{a_1}{a_2} = \frac{b_1}{b_2}$
8. The sum of the digits of a two-digit number is 12. The number obtained by interchanging its digit ex the given number by 18, then the number is:
 (a) 72 (b) 75 (c) 57 (d) none of these
 $\text{Number} = 10x + y$
 $x + y = 12$
 $(10y + x) - (10x + y) = 18$
9. Five years ago, Baljeet was thrice as old as Vikram and ten years later Baljeet shall be twice as old, then the present age of Baljeet is:
 (a) 20 (b) 50 (c) 30 (d) none of these

10. Assertion (A): If a and b are the zeroes of the polynomial $x^2 - 3x + p$ and $2a + 3b = 15$, then $p = 54$.
Reason (R): If a and b are the zeroes of the polynomial $x^2 + bx + c$, then $a + b = -b/a$ and $ab = c/a$.

- (a) Both (A) and (R) are true and (R) is the correct Explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct Explanation of (A).
(c) (A) is True but (R) is False.
(d) (A) is False but (R) is True.

SECTION (B)

Consists of 5 questions of 2 marks each.

11. Write the discriminant of the quadratic equation $(x + 5)^2 = 2(3x - 3)$. -194

12. Find the discriminant of the quadratic equation $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$. 64

13. For what value of k , does the system of linear equations:
 $2x + 3y = 7$ and $(k - 1)x + (k + 2)y = 3k$ having infinite number of solutions. 7

14. Three alarm clocks ring their alarms at regular intervals of 20 min, 25 min and 30 min respectively. If they first beep together at 12 noon, at what time will they beep again for the first time? $LCM(20, 25, 30) = 300 \text{ min}$
 $= 5 \text{ hours}$

OR

Find the HCF and LCM of 306 and 54 and verify that $HCF \times LCM = \text{Product of two numbers}$.
 $18, 918$ 16594

15. If α and β are the zeroes of $p(x) = x^2 + 7x + 12$, then find the value of $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$

$\alpha = -4, \beta = -3$ OR

$\alpha + \beta = -7$
 $\alpha\beta = 12$

Show that $5 + 2\sqrt{7}$ is an irrational number, given that $\sqrt{7}$ is an irrational number.

SECTION (c)

Consists of 5 questions of 3 marks each..

16. Find the zeroes of the quadratic polynomial $3x^2 + 4x - 4$ and verify the relationship between the zeroes and the coefficients. $\alpha = \frac{2}{3}, \beta = -2$

OR

$-\frac{4}{3} = -\frac{4}{3}$

Prove that $\sqrt{2} + \sqrt{3}$ is irrational.

17. For what value of k , the following pair of linear equations has no solution?

$10x + 5y - (k - 5) = 0$; $20x + 10y - k = 0$.

No solution for all real $k \neq 0$ OR

$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

Rohan's mother is 26 years older than him. The product of their ages 3 years from now will be 360. Represent the situation in the form of quadratic equation.

$x, x + 26$
Rohan's age mother's age

After 3 years

$(x + 3)(x + 29) = 360$

$x^2 + 32x - 973 = 0$

Fixed charge for first 2 days $y = 2, x = 18$
 $x + 5y = 28, x + 7y = 32$

18. A lending library has a fixed charge for the first two days and an additional charge for each day thereafter. Sunil paid Rs 28 for a book kept for seven days, while Sohail paid Rs 32 for the book he kept for nine days.

Find the charge for each extra day. $= y$

19. Father's age is three times the sum of ages of his two children. After 5 years his age will be twice the sum of ages of two children. Find the age of father.

$(3x+5) = 2(x+10)$

$x = 15$

OR

$45 = \text{Father}$

children total $= x+10$

The hypotenuse of a right-angled triangle is 6 meters more than twice the shortest side. If the third side is 2 meters less than the hypotenuse, find the sides of the triangle.

$x^2 - 8x - 20 = 0$

Shortest $= x$
 $= 10$

$11 = 2x+6$
 26

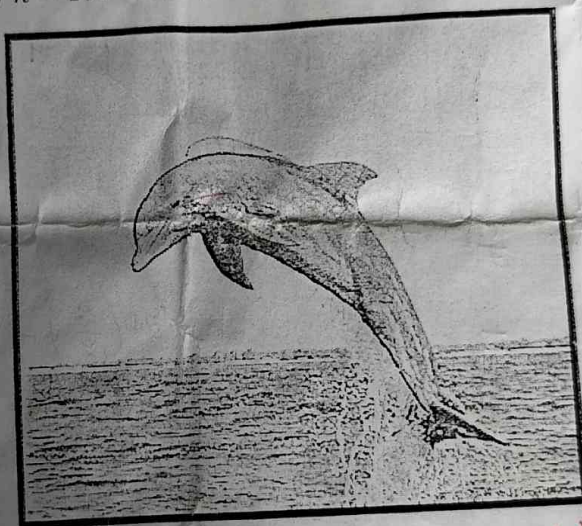
Third side $= (2x+6)-2 =$

20. A fraction becomes $1/3$ when 1 is subtracted from the numerator and it becomes $1/4$ when 8 is added to denominator.

SECTION D

Case study based question is compulsory.

21. In a pool at an aquarium, a dolphin jumps out of the water travelling at 20 cm per second. Its height above water level after t seconds is given by $h = 20t - 16t^2$.



Based on the above, answer the following questions:

(i) Find zeroes of polynomial $p(t) = 20t - 16t^2$.

$t(20-16t) = 0$

$t = 0$

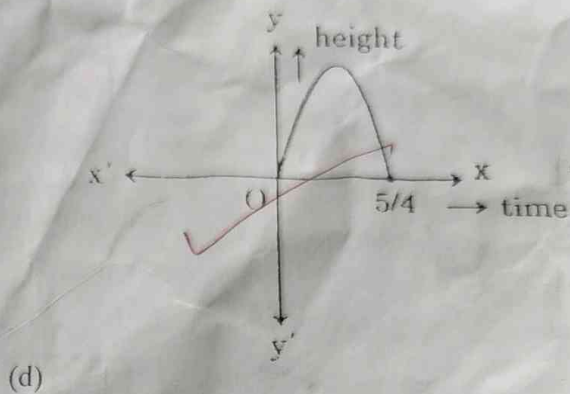
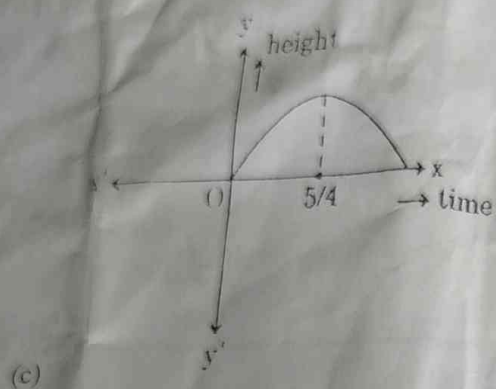
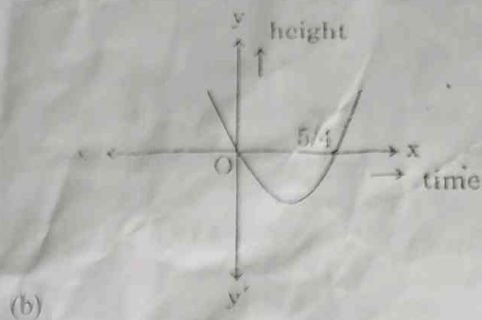
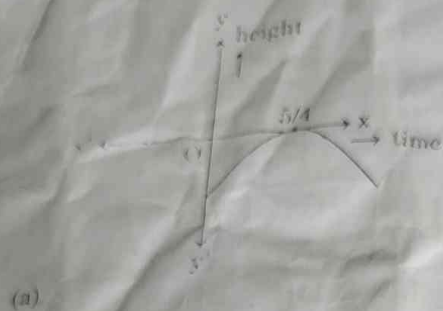
$t = \frac{5}{4}$

(ii) Which of the following type of graph represents $p(t)$?

quadratic polynomial

Downward opening parabola

(Concave down)



(iii) What would be the value of h at $t = \frac{3}{2}$? Interpret the result. -6 (1.5)

(iv) How much distance has the dolphin covered before hitting the water level again? (1.5)

$$h(t) = -16t^2 + 20t$$

$$h\left(\frac{3}{2}\right) = h = 20\left(\frac{3}{2}\right) - 16\left(\frac{3}{2}\right)^2$$

$$= 30 - \frac{144}{4} = 30 - 36 = -6$$

$$= \frac{20 \times 3}{1} - \frac{16 \times 9}{4}$$

$$= 30 - 36 = -6$$

$$h = \frac{-b}{2a} =$$

$$= \frac{-20}{2(-16)} = \frac{20}{32} = \frac{5}{8}$$

$$y = at^2 + bt + c = -16t^2 + 20t + 0$$